EMPACT

EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PRIMARY DB KEY:	**05-045-08212**	NAME/DESCRIP :	**110170077 PC12 CHEVRON 42-8 CASING**
LEASE #:			
FIELD/AREA:			

PROJECT NO. :	**202502080**	ANALYSIS NO. :	**06**
COMPANY NAME :	**QB ENERGY OPERATING, LLC**	ANALYSIS DATE:	FEBRUARY 27, 2025 20:16
OFFICE / BRANCH:	PARACHUTE, CO	SAMPLE DATE :	FEBRUARY 18, 2025
CUSTOMER REF:		TO:	
PRODUCER :	QB ENERGY OPERATING, LLC	EFFECTIVE DATE:	

*****FIELD DATA*****

SAMPLE CYCLE:			SAMPLE TYPE:	SPOT
SAMPLE PRES. :	145	psig	PROBE :	NO
FLOW PRES. :		psig	CYLINDER NO. :	E2575
LAB PRES:		psig	SAMPLED BY :	MIKE KELLEY
SAMPLE TEMP. :	41	ºf	SAMPLING COMPANY:	QB ENERGY
AMBIENT TEMP.:		ºf	H2S BY STAIN TUBE:	ppm mol
H2O BY STAIN TUBE:		#/mmcf	CO2 BY STAIN TUBE:	Mol %

FIELD COMMENTS:

LAB COMMENTS:

COMPONENT	MOLE %	MASS %	GPM @ 14.65	GPM @ 14.73
ALCOHOLS	0.0048	0.0152	0.0010	0.0010
HELIUM	0.01	0.00	---	---
HYDROGEN	2.69	0.29	---	---
OXYGEN/ARGON	0.00	0.00	---	---
NITROGEN	0.11	0.17	---	---
CARBON DIOXIDE	2.38	5.69	---	---
METHANE	85.5491	74.4960	---	---
ETHANE	6.0013	9.7951	1.6000	1.6087
PROPANE	1.7343	4.1511	0.4767	0.4793
I-BUTANE	0.3858	1.2172	0.1259	0.1266
N-BUTANE	0.6805	2.1469	0.2138	0.2150
I-PENTANE	0.1544	0.6043	0.0570	0.0573
N-PENTANE	0.0838	0.3282	0.0300	0.0301
HEXANES PLUS	0.2160	1.0960	0.0920	0.0922
TOTALS	100.00000	100.00000	2.5964	2.6102

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0060	0.0255
TOLUENE	0.0024	0.0120
ETHYLBENZENE	0.0001	0.0006
XYLENES	0.0006	0.0034
TOTAL BTEX	0.0091	0.0415

**(DETAILED HYDROCARBON ANALYSIS/NJ 1993)*
Mod ASTM D6730,GPA 2261 & GPA 2286.

***(CALC: GPA 2172, GPA 2145 & TP-17 @14.696 & 60 F)*

CALCULATED VALUES**

	BTU @	14.65		14.73	
LHV	NET DRY REAL :	972.8	**/scf**	978.1	**/scf**
	NET WET REAL :	955.8	**/scf**	961.1	**/scf**
HHV	GROSS DRY REAL :	1076.7	**/scf**	1082.6	**/scf**
	GROSS WET REAL :	1057.9	**/scf**	1063.8	**/scf**

NET HEATING VALUE (60 °F ideal reaction):	20056.4	**Btu/lbm**
GROSS HEATING VALUE (60°F ideal reaction):	22202.0	**Btu/lbm**
RELATIVE DENSITY (AIR=1):	0.6363	
DENSITY	0.04854	**lbm/scf**
COMPRESSIBILITY FACTOR :	0.9975	
REGULAR WOBBE INDEX	1350.7	

EMPACT

EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	202502080	ANALYSIS NO. :	06
COMPANY NAME :	QB ENERGY OPERATING, LLC	ANALYSIS DATE:	FEBRUARY 27, 2025 20:16
ACCOUNT NO. :		SAMPLE DATE :	FEBRUARY 18, 2025
PRODUCER :	QB ENERGY OPERATING, LLC	CYLINDER NO. :	E2575
LEASE NO. :		SAMPLED BY :	MIKE KELLEY
NAME/DESCRIP :	110170077 PC12 CHEVRON 42-8 CASING		
FIELD DATA		SAMPLE TEMP. :	41
SAMPLE PRES. :	145	AMBIENT TEMP.:	
H2S BY STAIN TUBE:	_ *ppm mol*		
COMMENTS :	*SPOT* *NO PROBE*		

Componet	Mole %	Wt %
Helium	0.01	0.00
Hydrogen	2.69	0.29
Carbon Dioxide	2.38	5.69
Nitrogen	0.11	0.17
Methane	85.5491	74.4960
Ethane	6.0013	9.7951
Propane	1.7343	4.1511
Isobutane	0.3858	1.2172
n-Butane	0.6805	2.1469
Isopentane	0.1512	0.5921
n-Pentane	0.0838	0.3282
Cyclopentane	0.0032	0.0122
n-Hexane	0.0306	0.1431
Cyclohexane	0.0104	0.0475
Other Hexanes	0.0846	0.3942
Heptanes	0.0423	0.2291
Methylcyclohexane	0.0145	0.0773
2,2,4 Trimethylpentane	0.0001	0.0006
Benzene	0.0060	0.0255
Toluene	0.0024	0.0120
Ethylbenzene	0.0001	0.0006
Xylenes	0.0006	0.0034
C8+ Heavies	0.0244	0.1627
Subtotal	99.99520	99.98480
Oxygen/Argon	0.00	0.00
Alcohols	0.0048	0.0152
Total	100.00000	100.00000

Calculated Values BTU @ **14.65**		**Total Sample**	**C6+ Fraction**	**C8+ Fraction**	**C10+ Fraction**	
LHV	Net Dry Real:	972.8	4701.9	5747.9	6699.0	**Btu/scf**
	Net Wet Real:	955.8	4619.7	5647.4	6581.9	**Btu/scf**
HHV	Gross Dry Real:	1076.7	5059.1	6157.5	7127.9	**Btu/scf**
	Gross Wet Real:	1057.9	4970.7	6049.9	7003.3	**Btu/scf**
Other Calculated Values						
Regualr Wobbe Index*		1350.7	2799.5	2997.7	3270.4	**Btu/scf**
Net Heating Value (60 °F ideal reaction):		20056.4	19053.2	17847.2	18442.8	**Btu/lbm**
Gross Heating Value (60°F ideal reaction):		22202.0	20502.2	19119.9	19623.5	**Btu/lbm**
Molar Mass (MW):		18.42268	93.513	122.587	138.307	**g/mol**
Relative Density (AIR=1):		0.6363	3.2284	4.2330	4.7753	**SG**
Density:		0.04854	0.24643	0.32303	0.36446	**lbm/scf**
Compressiblity Factor:		0.9975	0.9912	0.9985	0.9995	**Z**
Liquid Volume real gas @:	**14.65**	17.6675	0.0917	0.012	0.004	**gal/1000 scf**

**** The Wobbe pressure base in the number considered is based upon the given Pb of the HHV above.***

#DIV/0 or 0 (zero) will appear in the Calculated Value Section when there is no C6+, C8+ or C10+ in the sample to calculate these factors.

BDL - Below Detection Limit. The H2S LOS has a detection limit of 0.25 ppm. A _ (an uderscore) indicates there was no tube pulled for H2S.

EMPACT Analytical Systems Inc. 365 S Main St Brighton, CO 80601 303-637-0150

EXTENDED NATURAL GAS ANALYSIS (*DHA)

DHA COMPONENT LIST

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FIELD/AREA:			
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OFFICE / BRANCH:	PARACHUTE, CO	SAMPLE DATE :	FEBRUARY 18, 2025
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PRODUCER :	QB ENERGY OPERATING, LLC	EFFECTIVE DATE:	
FIELD DATA			
SAMPLE CYCLE:		SAMPLE TYPE:	SPOT
SAMPLE PRES. :	145 psig	PROBE :	NO
FLOW PRES. :	psig	CYLINDER NO. :	E2575
LAB PRES:	psig	SAMPLED BY :	MIKE KELLEY
SAMPLE TEMP. :	41 ºf	SAMPLING COMPANY:	QB ENERGY
AMBIENT TEMP.:	ºf	H2S BY STAIN TUBE:	_ ppm mol
H2O BY STAIN TUBE:	- #/mmcf	CO2 BY STAIN TUBE:	- Mol %
FIELD COMMENTS:			
LAB COMMENTS:			

COMPONENT	PIANO #	MOLE %	MASS %	GPM @ **14.65**	GPM @ **14.73**
Helium	---	0.01	0.00	---	---
Hydrogen	---	2.69	0.29	---	---
Nitrogen	---	0.11	0.17	---	---
Carbon Dioxide	---	2.38	5.69	---	---
Methane	P1	85.5491	74.4960	---	---
Ethane	P2	6.0013	9.7951	1.600	1.609
Propane	P3	1.7343	4.1511	0.477	0.479
i-Butane	I4	0.3858	1.2172	0.126	0.127
n-Butane	P4	0.2835	0.8944	0.089	0.089
2,2-Dimethylpropane	I5	0.0045	0.0176	0.002	0.002
i-Pentane	I5	0.1467	0.5745	0.054	0.054
Acetone	X3	0.0039	0.0123	0.001	0.001
i-Propanol	X3	0.0009	0.0029	0.000	0.000
UnknownC4s	U4	0.3970	1.2525	0.125	0.126
n-Pentane	P5	0.0837	0.3278	0.030	0.030
2,2-Dimethylbutane	I6	0.0067	0.0313	0.003	0.003
Cyclopentane	N5	0.0032	0.0122	0.001	0.001
2,3-Dimethylbutane	I6	0.0094	0.0440	0.004	0.004
2-Methylpentane	I6	0.0355	0.1660	0.015	0.015
3-Methylpentane	I6	0.0193	0.0903	0.008	0.008
UnknownC5s	U5	0.0001	0.0004	0.000	0.000
n-Hexane	P6	0.0306	0.1431	0.013	0.013
2,2-Dimethylpentane	I7	0.0012	0.0065	0.001	0.001
Methylcyclopentane	N6	0.0137	0.0626	0.005	0.005
2,4-Dimethylpentane	I7	0.0025	0.0136	0.001	0.001
2,2,3-Trimethylbutane	I7	0.0007	0.0038	0.000	0.000

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Benzene	A6	0.0060	0.0255	0.002	0.002
3,3-Dimethylpentane	I7	0.0007	0.0038	0.000	0.000
Cyclohexane	N6	0.0104	0.0475	0.004	0.004
2-Methylhexane	I7	0.0089	0.0484	0.004	0.004
2,3-Dimethylpentane	I7	0.0022	0.0119	0.001	0.001
1,1-Dimethylcyclopentane	N7	0.0015	0.0080	0.001	0.001
3-Methylhexane	I7	0.0074	0.0403	0.003	0.003
1c,3-Dimethylcyclopentane	N7	0.0018	0.0096	0.001	0.001
1t,3-Dimethylcyclopentane	N7	0.0016	0.0085	0.001	0.001
3-Ethylpentane	I7	0.0003	0.0016	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0025	0.0133	0.001	0.001
2,2,4-Trimethylpentane	I8	0.0001	0.0006	0.000	0.000
n-Heptane	P7	0.0103	0.0560	0.005	0.005
1c,2-Dimethylcyclopentane	N7	0.0002	0.0011	0.000	0.000
Methylcyclohexane	N7	0.0145	0.0773	0.006	0.006
2,2-Dimethylhexane	I8	0.0005	0.0031	0.000	0.000
1,1,3-Trimethylcyclopentane	N7	0.0001	0.0006	0.000	0.000
Ethylcyclopentane	N7	0.0004	0.0021	0.000	0.000
2,5-Dimethylhexane	I8	0.0006	0.0037	0.000	0.000
2,2,3-Trimethylpentane	I8	0.0005	0.0031	0.000	0.000
2,4-Dimethylhexane	I8	0.0001	0.0006	0.000	0.000
1c,2t,4-Trimethylcyclopentane	N8	0.0002	0.0012	0.000	0.000
3,3-Dimethylhexane	I8	0.0002	0.0012	0.000	0.000
Toluene	A7	0.0024	0.0120	0.001	0.001
2,3-Dimethylhexane	I8	0.0002	0.0012	0.000	0.000
2-Methylheptane	I8	0.0014	0.0087	0.001	0.001
4-Methylheptane	I8	0.0004	0.0025	0.000	0.000
3-Methylheptane	I8	0.0010	0.0062	0.001	0.001
1c,2t,3-Trimethylcyclopentane	N8	0.0010	0.0061	0.001	0.001
3-Ethylhexane	I8	0.0001	0.0006	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0004	0.0024	0.000	0.000
1,1-Dimethylcyclohexane	N8	0.0001	0.0006	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0002	0.0012	0.000	0.000
n-Octane	P8	0.0015	0.0093	0.001	0.001
1c,4-Dimethylcyclohexane	N8	0.0002	0.0012	0.000	0.000
2,2-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0001	0.0007	0.000	0.000
Ethylcyclohexane	N8	0.0004	0.0024	0.000	0.000
n-Propylcyclopentane	N8	0.0001	0.0006	0.000	0.000
1c,3c,5-Trimethylcyclohexane	N9	0.0001	0.0007	0.000	0.000
2,5-Dimethylheptane	I9	0.0004	0.0028	0.000	0.000
3,3-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
3,5-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
2,6-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
Ethylbenzene	I8	0.0001	0.0006	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0002	0.0011	0.000	0.000
1,4-Dimethylbenzene (p-Xylene)	A8	0.0001	0.0006	0.000	0.000
4-Methyloctane	I9	0.0001	0.0007	0.000	0.000
2-Methyloctane	I9	0.0001	0.0007	0.000	0.000
1c,2t,4c-Trimethylcyclohexane	I9	0.0001	0.0007	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0003	0.0017	0.000	0.000
n-Nonane	P9	0.0001	0.0007	0.000	0.000
i-Propylbenzene	A9	0.0002	0.0013	0.000	0.000
3,6-Dimethyloctane	I10	0.0010	0.0077	0.001	0.001
1,3-Methylethylbenzene	A9	0.0035	0.0228	0.002	0.002
1,4-Methylethylbenzene	A9	0.0016	0.0104	0.001	0.001
1,3,5-Trimethylbenzene	A9	0.0015	0.0098	0.001	0.001
2-Methylnonane	I10	0.0012	0.0093	0.001	0.001

t-Butylbenzene	A10	0.0040	0.0291	0.002	0.002
sec-Butylbenzene	A10	0.0001	0.0007	0.000	0.000
1,2,3-Trimethylbenzene	A9	0.0005	0.0033	0.000	0.000
1,4-Methyl-i-propylbenzene	A10	0.0001	0.0007	0.000	0.000
1,4-Diethylbenzene	A10	0.0001	0.0007	0.000	0.000
n-Hexadecane	P16	0.0001	0.0012	0.000	0.000
TOTAL		100.00000	100.00000	2.5964	2.6102

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0060	0.0255
TOLUENE	0.0024	0.0120
ETHYLBENZENE	0.0001	0.0006
XYLENES	0.0006	0.0034
TOTAL BTEX	0.0091	0.0415

**(DETAILED HYDROCARBON ANALYSIS/NJ 1993) Mod ASTM D6730,GPA 2261 & GPA 2286.*

***(CALC: GPA 2172, GPA 2145 & TP-17 @14.696 & 60 F)*

CALCULATED VALUES**

	BTU @	14.65	14.73
LHV	NET DRY REAL :	972.8 /scf	978.1 /scf
	NET WET REAL :	955.8 /scf	961.1 /scf
HHV	GROSS DRY REAL :	1076.7 /scf	1082.6 /scf
	GROSS WET REAL :	1057.9 /scf	1063.8 /scf
	NET HEATING VALUE (60 °F ideal reaction):		20056.4 Btu/lbm
	GROSS HEATING VALUE (60°F ideal reaction):		22202.0 Btu/lbm
	RELATIVE DENSITY (AIR=1):		0.6363
	DENSITY		0.04854 lb/scf
	COMPRESSIBILITY FACTOR :		0.9975
	REGULAR WOBBE INDEX		1350.7

C6+ Fraction of DHA Gas Analysis @60°F, 14.696 psia

Net Dry Ideal BTU	4675 /scf	Relative Density - SG (Air=1)	3.2284		***C6+factors***
Gross Dry Ideal BTU	5030.1 /scf	**Z** Compressiblity Factor	0.99116		0.99022
Net Dry Ideal BTU	19053.2 /lb	Density Factor	246.432	lbm/1000 ft3	
Gross Dry Ideal BTU	20502.2 /lb	Molar Mass or MW	93.513	g/mol	
		Volume Liquid Ideal gas	0.092	scf/gal	23.7

This hexanes plus fraction may be applied in place of published C6+ factors. The Z & GPM need additional calc for C6+ factors.

#DIV/0 or 0 (zero) will appear in this section when there is no hexanes plus in the sample to calculate C6+ factors.